

**What Is Claimed Is:**

- 1 1. An ESD protection circuit, located on a substrate of a first  
2 conductivity type, comprising:  
3 a lateral silicon controlled rectifier (SCR), comprising:  
4 a P-type layer, as an anode of the SCR;  
5 an N-type layer, as a cathode of the SCR;  
6 a first N-well, located between the P-type layer and the  
7 N-type layer, contacted with the P-type layer; and  
8 a first P-well, contacted to the first N-well and the  
9 N-type layer; and  
10 a deep well of a second conductivity type, located between  
11 the lateral SCR and the substrate, for isolating the  
12 electric connection between the substrate and the lateral  
13 SCR.
- 1 2. The ESD protection component as claimed in claim 1, wherein  
2 the N-type layer is formed by a first N-type diffusion in the  
3 first P-well.
- 1 3. The ESD protection component as claimed in claim 1, wherein  
2 the first P-well is coupled to the cathode.
- 1 4. The ESD protection component as claimed in claim 1, wherein  
2 the lateral SCR is an N-type SCR (N-type silicon rectifier,  
3 NSCR).
- 1 5. The ESD protection component as claimed in claim 1, wherein  
2 the lateral SCR is a P-type SCR (P-type silicon rectifier,  
3 PSCR).

1 6. The ESD protection component as claimed in claim 1, wherein  
2 the P-type layer is located in the first N-well.

1 7. The ESD protection circuit as claimed in claim 1, wherein the  
2 substrate is an N-substrate and the deep well is a deep P-  
3 well.

1 8. The ESD protection component as claimed in claim 1, wherein  
2 the substrate is a P-substrate and the deep well is a deep  
3 N-well.

1 9. The ESD protection component as claimed in claim 8, wherein  
2 the deep N-well is connected to a fix-biased N-well and coupled  
3 to a relatively high voltage power source.

1 10. The ESD protection component as claimed in claim 9, wherein  
2 the fixed-biased N-well, the deep N-well and the first N-well  
3 electrically isolate the first P-well and the P-substrate.

1 11. The ESD protection component as claimed in claim 9, wherein  
2 the fixed-biased N-well, the deep N-well and the first N-well  
3 electrically isolate the P-type layer and the P-substrate.

1 12. The ESD protection component as claimed in claim 9, wherein  
2 the fixed-biased N-well encloses the lateral SCR.

1 13. The ESD protection component as claimed in claim 8, wherein  
2 the N-type layer comprises a second N-well, the deep N-well  
3 comprises a separated first deep N-well and second deep N-

4 well, respectively abutting the first N-well and the second  
5 N-well.

1 14. An ESD protection circuit, coupled between a first  
2 connection pad and a second connection pad, comprising:  
3 an ESD protection component, having an anode and a cathode,  
4 located on a substrate of a first conductivity type,  
5 comprising:

6 a lateral SCR, comprising:

7 a P-type layer, as the anode of the SCR;

8 a N-type layer, as the cathode of the SCR;

9 a first N-well, located between the P-type layer and the  
10 N-type layer, contacted with the P-type layer; and

11 a first P-well, contacted to the first N-well and the  
12 N-type layer; and

13 a deep well of a second conductivity type, located between  
14 the lateral SCR and the substrate, for isolating the  
15 electric connection between the lateral SCR and the  
16 substrate;

17 wherein the anode and the cathode are coupled to the first  
18 connection pad and the second connection pad,  
19 respectively.

1 15. The ESD protection circuit as claimed in claim 14, wherein  
2 the substrate is a P-substrate coupled to a relatively low  
3 power rail, and the deep well is a deep N-well coupled to a  
4 relatively high power rail.

1 16. The ESD protection circuit as claimed in claim 14, wherein  
2 the substrate is a N-substrate coupled to a relatively high

3 power rail, and the deep well is a deep P-well coupled to a  
4 relatively low power rail.

1 17. The ESD protection circuit as claimed in claim 14, wherein  
2 the ESD protection circuit further comprises a diode, coupled  
3 between the first connection pad and the second connection pad,  
4 and forward stacked with the lateral SCR.

1 18. The ESD protection circuit as claimed in claim 14, wherein  
2 the lateral SCR is an NSCR, and the ESD protection circuit  
3 further comprises an ESD-detection circuit providing a trigger  
4 voltage to a control gate of the NSCR at the occurrence of the  
5 ESD event to trigger on the NSCR.

1 19. The ESD protection circuit as claimed in claim 18, wherein  
2 the ESD-detection circuit comprises a RC circuit, for  
3 detecting an ESD event.

1 20. The ESD protection circuit as claimed in claim 14, wherein  
2 the lateral SCR is a PSCR, and the ESD protection circuit  
3 further comprises an ESD-detection circuit providing a trigger  
4 voltage to a control gate of the PSCR at the occurrence of the  
5 ESD event to trigger on the PSCR.

1 21. The ESD protection circuit as claimed in claim 20, wherein  
2 the ESD-detection circuit comprises a RC circuit, for  
3 detecting an ESD event.

1 22. The ESD protection circuit as claimed in claim 14, wherein  
2 the first connection pad is used as an input of a relatively

3 high-voltage power source, and the second connection pad is  
4 used as an input of the relatively low-voltage power source.

1 23. The ESD protection circuit as claimed in claim 14, wherein  
2 the first connection pad is used as a high voltage power pad,  
3 and the second connection pad is used as an I/O pad.

1 24. The ESD protection circuit as claimed in claim 14, wherein  
2 the first connection pad is used as an I/O pad, and the second  
3 connection pad is used as a low voltage power pad.

1 25. The ESD protection circuit as claimed in claim 14, wherein  
2 the first connection pad is a high voltage power pad, and the  
3 second connection pad is a low voltage power pad.

1 26. The ESD protection circuit as claimed in claim 14, wherein  
2 the ESD protection circuit further comprises an inverted ESD  
3 protection component, having an anode coupled to the second  
4 connection pad and a cathode coupled to the first connection  
5 pad.

1 27. The ESD protection circuit as claimed in claim 14, wherein  
2 the ESD protection circuit comprises a plurality of ESD  
3 protection components, forwardly stacked between the first  
4 connection pad and the second connection pad for preventing  
5 from latch-up problem.